

PrimaryConnections - an introduction



Australian Government

**Department of Education, Employment
and Workplace Relations**



Australian Academy of Science

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This booklet is an introduction to the 'Primary**Connections**: Linking science with literacy' programme.

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What is Primary**Connections**?

‘Primary**Connections**: Linking science with literacy’ is an innovative approach to teaching and learning which aims to enhance primary school teachers’ confidence and competence for teaching science.

A partnership between the Australian Academy of Science (the Academy) and the Australian Government Department of Education, Employment and Workplace Relations, Primary**Connections** focuses on developing students’ knowledge, skills, understanding and capacities in both science and literacy.

Current research highlights that successful science education requires teachers to be supported not only with curriculum resources but also with professional learning to boost their pedagogical content knowledge in the teaching of science and literacy.

The Primary**Connections** programme provides both components, which have undergone substantial trialling and will support the implementation of the Australian National Curriculum.



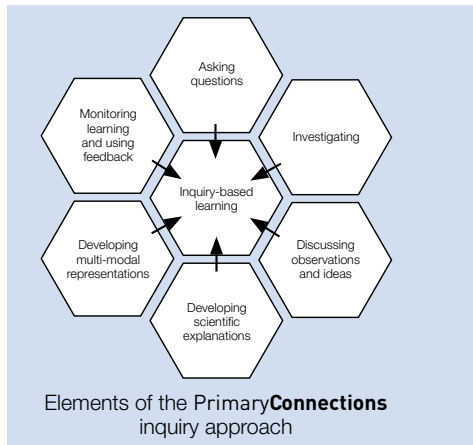
Primary**Connections** curriculum units

Primary**Connections** key features

■ **Inquiry and investigative approach**

Primary**Connections** employs an inquiry approach to teaching and learning and features:

- student-centred learning
- the linking of science with literacy
- student planned investigations
- embedded assessment
- cooperative learning.



■ **A comprehensive professional learning programme**

- Master Facilitators, Professional Learning Facilitators and Curriculum Leaders Australia-wide are trained to provide professional learning in the teaching and learning approach.
- Primary**Connections** Facilitators are supported with a training manual, electronic resources and DVDs.

■ **Curriculum resources - linking science with literacy**

- Curriculum resources have been developed to span the primary years of schooling and build on students' natural curiosity and sense of wonder about how the world works. Students are supported to develop their skills and capacity in working scientifically, and to enhance their understanding of the nature of science.
- The award-winning¹ units include teacher background information and a science background CD, and are supported by web resources, including assessment rubrics and unit planners.

¹The Australian Awards for Excellence in Educational Publishing Category Winner 2006.

"I now feel as though I can actually teach science in a quality way and enjoy doing it."

Trial teacher, New South Wales

"This is the most invigorating and rewarding project I have been involved in."

*Professional Learning Facilitator,
Western Australia*

The PrimaryConnections 5Es teaching and learning model

- The 5Es teaching and learning model is used in the curriculum units to effectively support students' conceptual development.
- The inquiry-oriented teaching and learning model progresses through five phases: *Engage*, *Explore*, *Explain*, *Elaborate* and *Evaluate* (See Curriculum resources - unpacked page.)

■ An Indigenous Perspective Framework

- The framework supports teachers to incorporate relevant, contextualised and embedded Indigenous perspectives and includes: a teaching and learning guide; curriculum unit links to relevant Indigenous perspectives; and a professional learning module. See www.science.org.au/primaryconnections/indigenous.htm

■ An ongoing research and evaluation programme

- The effectiveness of the professional learning programme and the curriculum resources are evaluated with a view to improving teaching and learning. The research reports are on the Academy's website. See <http://www.science.org.au/primaryconnections/research.htm>



Students 'doing' science

Research on PrimaryConnections indicates that the programme:

- improves teachers' confidence and capacity to teach science
- increases the amount of time teachers spend teaching science
- improves student attitudes to and understanding of science.

"I am now teaching Science at our school from Kindergarten to Year 6 using the PrimaryConnections program. I am having great success and the students love it!"

Professional Learning Facilitator, New South Wales

"All students were more motivated for writing and literacy..."

Teacher at Pannington Primary School

Professional learning - unpacked

Primary**Connections** is a comprehensive approach to teaching and learning. The purpose of the programme is to build teacher competence and confidence in teaching both science and literacy. It is also an opportunity to build the capacity of primary teachers as curriculum leaders. Hence, the professional learning component of Primary**Connections** is central to the programme.

The Making**Connections** Professional learning manual is a guide for facilitators who will support the uptake of the Primary**Connections** programme. It includes workshop modules on the key elements of Primary**Connections**, PowerPoint presentations and digital resources.



Making**Connections** manual

Making**Connections** contents:

- Overview
- Facilitation tools and techniques
- Introduction to Primary**Connections**
- Science and literacy
- 5Es
- Investigating
- Cooperative learning
- Indigenous perspectives
- Unit planning
- Questioning Minds
- Reflection and journaling

Primary**Connections** facilitator role

Primary**Connections** facilitators work within their state to support schools expressing interest in implementing the programme. Each state and territory jurisdiction decides the way they will support schools. State coordinators and facilitators are available in each state to discuss Primary**Connections** requirements. See www.science.org.au/primaryconnections/plc.htm.

A variety of models and some possible roles for facilitators include:

- working with a jurisdiction to develop models of support for schools expressing interest in the uptake of Primary**Connections**
- facilitating professional learning workshops for teachers and administrators of primary schools
- mentoring school coordinators to take on a curriculum leadership role in their school.



Teachers at Primary**Connections** workshops



Primary**Connections** facilitators attend three days of intensive training at the Australian Academy of Science Shine Dome

Curriculum resources - unpacked

Primary**Connections** curriculum resources feature an explicit focus on developing students' knowledge, skills, understanding and capacities in science and literacy. Once trained to use these resources, teachers assist students to use their everyday literacies to learn the literacies of science, with the science context providing authentic and meaningful purposes for literacy learning.

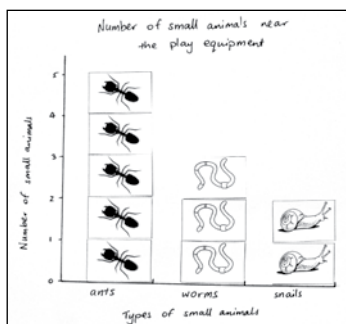
Literacies of science are the particular practices, processes and products used to represent and communicate understanding of science concepts, processes and skills, including: factual texts, data tables, labelled diagrams, graphs, models, drawings and embodied forms such as gesture and role play. Literacies of science are used to reason with and develop science understandings, and to represent data in the conventional forms used to communicate scientific information.



Each curriculum unit resource includes a science background CD

Literacy focus

A **graph** organises, represents and summarises information so that patterns and relationships can be identified. Graphs have a title and each variable is labelled on the graph axes, including the units of measurement. Graph types include picture, column and line graphs.



Sample graph comparing types of small animals found

Assessment of students' learning is ongoing and embedded to enhance learning in PrimaryConnections units and is linked to the development of literacy products in each phase.

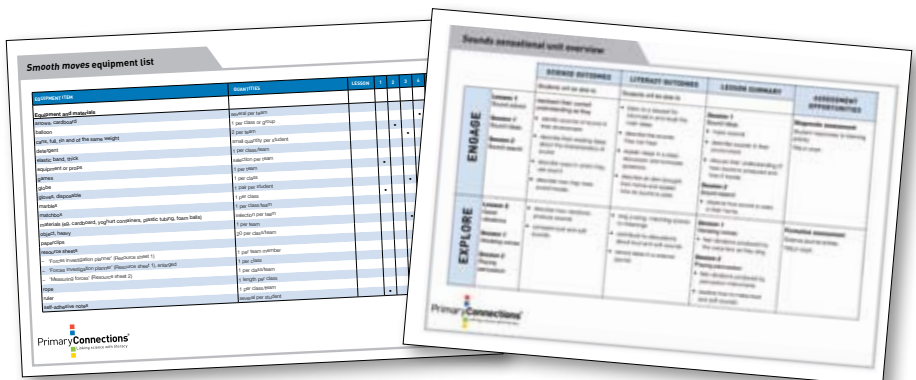
The relationships between the 5Es phases, investigations, literacy products and assessment are illustrated in the below table.

Phase	Focus
ENGAGE	Engage students and elicit prior knowledge Diagnostic assessment
EXPLORE	Provide hands-on experience of the phenomenon Formative assessment
EXPLAIN	Develop scientific explanations for observations and represent developing conceptual understanding Consider current scientific explanations Formative assessment
ELABORATE	Extend understanding to a new context or make connections to additional concepts through a student-planned investigation Summative assessment of the investigating outcomes
EVALUATE	Students represent their understanding and reflect on their learning journey and teachers collect evidence about the achievement of outcomes Summative assessment of the conceptual outcomes

PrimaryConnections 5Es teaching and learning model

The units include:

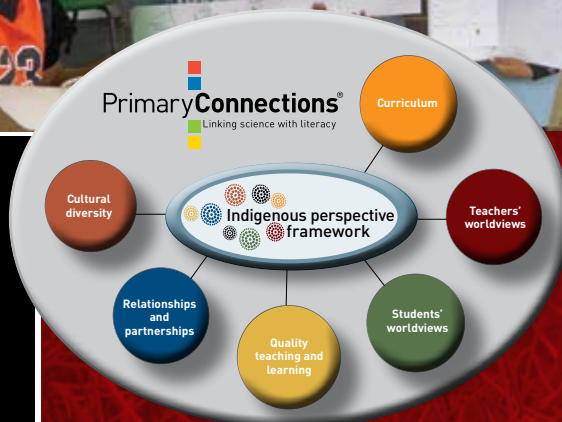
- Equipment lists
- Student planners
- 'How to' appendices
- Unit overviews
- Assessment rubrics



Primary**Connections** Incorporating Indigenous Perspectives



The Primary**Connections** Indigenous perspective framework is designed to support teachers to link science with literacy and Indigenous Perspectives.



"There was a lot of learning across the whole school due to the science unit, and this didn't go unnoticed.

All the students were very engaged, and it was a rich learning environment."

Teacher at Kennedy Primary School.



Connecting Minds DVD

The Connecting Minds DVD shows the linking of science with literacy and Indigenous perspectives, and demonstrates this happening in classrooms.

The Primary**Connections** units are an ideal way to link science with literacy and Indigenous perspectives in the classroom. Indigenous perspectives curriculum links have been developed for the suite of Primary**Connections** units and are available on the Academy website - www.science.org.au/primaryconnections/ip-curriculum



PrimaryConnections Unit map April 2009

Primary Connections Stage	Outcome level*	Year of schooling	Earth and Beyond	Energy and Change	Life and Living	Natural and Processed Materials
Early Stage1	< 1	1	Stage theme: Investigating my surroundings and me			
			Weather in my world Weather, its features and how it affects my daily life	On the move Movement of humans and toys	Staying alive Needs for survival of people and familiar animals; the senses	What's it made of? Properties and uses of materials in the school environment
			Stage theme: Organising my world			
1	1-2	2 & 3		Sounds sensational Properties, transmission and use of sound energy	Schoolyard safari Features, habitats and behaviour of small invertebrates	Spot the difference Changes to observable properties of materials (eg when solids melt)
			Water works Water as a natural resource; using water responsibly	Push pull Pushes and pulls in everyday situations		
2	2-3	4 & 5	Stage theme: Changes, patterns and relationships in my world			
			Spinning in space Size and relative movement of Earth, Sun and Moon; day and night	Light fantastic Transmission and use of light energy	Plants in action Needs and life cycle of flowering plants	
				Smooth moves Effect on motion of different sized forces acting directly and indirectly		Material world Properties of materials determine their use
3	3-4	6 & 7	Stage theme: Systems and how they work			
			Earthquake explorers Sudden changes to the Earth's surface caused by tectonic plate movement (eg, earthquakes)	It's electrifying Electrical energy is stored, transferred and transformed into other forms of energy; electric circuits	Marvellous micro-organisms Characteristics, needs and uses of micro-organisms (eg, yeast and mould)	Package it better Design and make a package to meet the criteria of a design brief
						Change detectives Physical and chemical changes to materials

'Primary**Connections**: Linking science with literacy' is an innovative programme linking the teaching of science with the teaching of literacy in primary schools.

The programme combines a sophisticated professional learning programme with exemplary curriculum resources.

Primary**Connections** features an inquiry-based approach, embedded assessment and incorporates Indigenous perspectives.

The Primary**Connections** curriculum resources span all years of primary school. Once trained in their use, teachers may use them individually or as part of the suite of Primary**Connections** materials.

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